

## RESTORATION TIPS:

I believe there is a need on this site for some very basic restoration advice. There is a lot of conflicting information floating around the net and in my opinion, some is good and some is bad. The following should be viewed as opinion only and is based on my experience, it should be used as a guideline only. You are the one restoring your boat and this makes you the one responsible for researching every aspect of its restoration, safety and performance. You will want to use the information here as a basic starting point and post any questions you may have to appropriate forums and query your local businesses and material suppliers as well.

This advice is given with the understanding that we are talking about repairs using polyurethane resin, the original material used in the boats construction. There is a West System epoxy which can be used instead and is argued to be superior. Use of this material will require obtaining information specific to the West System epoxy which may be obtained from West Marine for free.

See Safety section below.

### Transom

The transom is the area of the boat onto which the outboard motor is installed or the outdrive is attached to. It is typically constructed of plywood which was placed inside the back of the hull during the boats construction and glassed into place. At this stage a deck was placed over the top of the hull, screwed and / or glued together or fiberglassed together on the inside. The Transom is one of the most important aspects of the boats construction and its condition is important to your safety.

With safety in mind, I would like to present one bit of advice which I see as an imperative; DO NOT under any circumstances cut through the outside of the hull to replace the transom. There are a lot of people who will argue this point. They will say that it is the easiest way to replace a transom and that you can simply replace the area of the hull you removed and glass it back together. It has been argued that the use of epoxy instead of polyester allows for cutting a boat apart in this manner and perhaps under ideal conditions that is the case.

The problem I see, is that what is easiest is not always what is best. These boats are poised to become very expensive in the near future, they are very rare and should be considered irreplaceable. Restoration is difficult and only some of the people who begin a restoration will be able to follow through with it's completion. It would be a shame to damage one of these boats because you just want to do what seems easiest. Keep in mind that if you are unable to complete the restoration you will be better off if you have something more easily resold. Many knowledgeable collectors will not purchase a boat that has been compromised by cutting off the back of the hull. While it may be possible to save such a boat using heroic measures or epoxy resin, I still feel it is best to refrain from this approach in the first place. A cut-through hull in the area of the transom will usually show cracking around the area of the cut which is a very unsightly give away.

In my experience, the proper way of replacing a transom is to remove the inside of the fiberglass covering the wood, and then remove the wood from the inside of the boat. This will not destroy the structural integrity of the hull the way cutting through the hull itself will. Sometimes it is not any harder to do it this way, but sometimes it will be necessary to remove the deck. There may even be a few instances where removing the deck is so difficult that it is reasonable to cut through the back portion of the deck, such as the splash well area, then after transom replacement it can be reattached and repaired. This is OK in the case of the deck because it is not under anywhere near the amount stress that the transom area of the hull is. The motor weighs as much as a couple of hundred pounds and typically puts 50 or 75 horsepower into the boat. There is also the pounding of waves against the hull and the cantilever action of the motor fighting against the transom to consider.

Most of these boats have been sitting outside for decades, filled with water, so it is usually not hard to remove the rotted wood. I jokingly told a friend of mine that the transom could be removed with a spoon and he told me that this was indeed possible and in fact he had used something like that to do the job on the Meteor he was restoring! Some people remove the old transom by scooping it out and then fill the resulting pocket where the transom was with a pourable transom material. This method is certainly an easy way to go in as much as it is not necessary to remove any of the fiberglass, inside nor outside but again, easy is not usually best and while I have never used a pourable transom, I feel that these boats should be restored with a wooden transom, as originally built. There is a good deal of information on the web about pourable transoms if you would like to research them yourself but keep in mind the manufacturers website sales pitch is likely to be pretty optimistic. These are usually small boats so keep the relative weight of a pourable transom in mind as compared to wood.

If you decide to go with a wood transom as originally built then the wood used in the replacement should not be treated plywood. This is because treated plywood interferes with the adhesion of typical polyester resin. There is, I believe, a resin formula which may be used with treated plywood, but I do not have any real knowledge of it or any experience with it so unless and until I update this page, you will need to research this possibility yourself. These boats, once restored are likely to be stored indoors, and once someone goes to the difficulty of finishing one, they are at least unlikely to be left under a tree to be filled with rainwater. Therefore, untreated plywood should be fine. The inner layer of fiberglass will prevent the wood from absorbing water. It is only long standing water that can cause a problem when it enters through pinholes or screw holes, not the kind of occasional water intake associated with ordinary boating.

I believe the best plywood to use in a restoration is Marine Grade plywood. This is not anymore rot resistant than any other, rather it is a better quality of wood with no inner voids from knot holes or rough outer surfaces and is very easy to work with. Most lumber yards can order it, but few will carry it in stock so plan ahead and order early, keeping in mind the thickness needed. Usually it is wise to install two or more sheets, cut to shape in advance. For instance a 1-1/2 inch thick wooden transom can be easily made from two layers of 3/4 inch and will be much easier to install since you are wrestling with only half the weight at a time. Keep in mind that there might be as much as 1/4 inch of fiberglass on each side so check motor bracket clearance before committing to a particular plywood thickness.

Once the transom is removed from the boat, you will want to use poster board or cardboard to create a pattern to copy onto the plywood. The area to be covered with plywood will need to be clean and oil free. Use a sander if necessary to create a good bonding surface. You may use long clamps to hold the plywood in place during the curing process, or you may drill a number of holes through the outside of the hull and secure the wood in place with wood screws, you should obviously have an electric screwdriver or drill to insert the screws quickly before the resin sets. You may even want to install the holding screws in advance to see how it all goes then remove them in preparation to glue in the transom, one sheet of ply at a time. Once the transom is in, the holes can then be filled, they will not cause any weakness in the hull. The second layer of plywood can be installed the same as the first. Both pieces are installed using an adequate amount of fiberglass mat and resin to fill any roughness and voids between the wood and the outer hull, and between the individual sheets of wood. Once all this is done, the inner layer of fiberglass should be replaced using fresh material whenever practical

## **Motor well**

Most boats made prior to 1959 seem to have open transoms meaning that any waves coming over the back end up in the bottom of the boats hull. This can swamp a small boat, especially if it is overloaded and it creates a serious safety issue on rough water. It appears that most boats produced in 1959 and after had motor wells, also known as splash wells. These are simply fiberglass tubs, usually shaped something like a rectangular bathroom sink. They fit ahead of the outboard motor and the bottom of the

motor well is slightly below the clamps holding the motor onto the transom. Motor wells vary greatly in design but are typically 3-6 inches deep. There is a drain hole about 1 inch in diameter through the back of the transom which is fitted with a brass tube that is sealed in place against moisture. Sometimes there is some significant aft deck space ahead of the motor well but sometimes this is only a raised area a few inches wide. I would like to take a minute here to suggest the modification of the older boats to include a motor well is a very reasonable precaution to take. Even the most stringent of classic car restoration guidelines allow for the installation of after market seat belts regardless of how modern they are in appearance or design. This is done to encourage at least a minimum amount of safety. I think that a similar allowance or deviation from originality should be strongly encouraged during the restoration of the older boats.

A motor well is not hard to fashion and can be made in stages. I created one by first placing wax paper on a sheet of glass. I built up a fiberglass panel using layers of cloth and mat. Once this was done, I added card board sidewalls on to three sides again with a layer of wax paper. I then built up the correctly shaped sides and front panel. This came together at a 90 degree edge. This inside edge was then filled with Duraglass in order to create a curved and more flowing surface which appeared to be more in keeping with the character of the boats lines. I went on to lay up more fiberglass over the newly formed inner curvature and used a belt sander to grind away the excess material from the back side. In that area I then laid up the final layers of fiberglass and finally installed the newly created motor well into position on the transom which formed the fourth side of the box shaped motor well. Motor wells are to be suspended above the floor of the boat, the bottom of the motor well as high as the outboard motor clamps will allow. This area beneath the motor well makes a good place for a battery, electrical box or other equipment to be placed.

### **Fiberglass Repair Tips**

Many people have a tear or hole in the deck or hull and attempt to patch it by slapping a little fiberglass mat on it without any preparation or planning. What needs to be done is to determine what caused the crack, tear or hole. If it is a high stress area, then you will want to reinforce it during the repair. For best results it should be repaired on top as well as from underneath. Additional layers or even wood stringers can be placed on the underside where out of view. Mat is OK for minor areas with low stress, but cloth is much more strong. These materials are referred to by weight. One ounce cloth is stronger than ½ ounce cloth, just as one ounce mat is stronger than ½ ounce mat. Never place either over the top of the Gel Coat. Grind away the Gel coat in the area to be repaired and even consider grinding into the fiberglass some for clearance, this will prevent an unsightly lump from appearing in the repaired area. Remember that the finish will often shrink, whether paint or gel coat, and this shrinkage will give away the material under it. Therefore the outermost layer should be mat, not cloth, though cloth should be used under that for strength. Cloth will show a texture through the finish but mat will tend to hide under the finish and give a much better appearance. Think of mat as a “cloaking device” for the cloth. So from the inside out, you will want the original damaged fiberglass (possibly ground thinner for clearance), then a layer of mat (random fibers) to help work out any air bubbles, then a layer of cloth for strength, and to hide the cloth pattern, another layer of mat, finally the finish goes on over that. On the reverse side of the damage you may also have a layer of mat to help work out any air bubbles, then a layer of cloth for strength and possibly a wooden stringer glassed in as well depending on the situation. Holes may be easily filled in by using a duct tape dam from the underside to give you a proper work area. This dam is simply pulled loose after the material cures, before turning your attention to the underside of the repair. The outside of the repaired area may now be refinished using either of the two methods outlined below.



## **Finish**

The Gel Coat is the outer finish of the boat and is essentially colored fiberglass resin. It is the first thing sprayed or brushed into the mold during construction and its thickness can vary greatly. The Gel Coat can dry out over time, especially if it is left in the sun and aside from the transom this is the main problem with these boats. Flexing of the deck and hull and drying out of the finish causes cracks that can be either small hairline cracks or cracks so large that pieces of gel coat actually fall off the Fiberglass underneath.

There are different schools of thought when it comes to restoring the finish. If the cracks are not so deep and wide as to cause pieces flaking off, then many people simply primer it up and paint over the boat without any real preparation. This is the wrong approach and it is so common that it has given a "restored" boat a bad name to knowledgeable collectors who typically prefer to do the work themselves so that they know it is done right. What goes wrong in an amateur spray paint restoration is that the primer that fills the cracks has different properties than the gel coat so it simply cracks again in all of the same spots and very quickly at that. People often get one of these boats and spend a lot of money on modern plastic steering wheels, common mail order fittings, primer and paint and then feel that they have increased the value of the boat by the amount of time and money that they have spent on it. These people are very disappointed to find that a knowledgeable collector will only pay the un-restored value for such a boat, the fact that the "restorer" has wasted his time and money is very frustrating to both parties. We want to see period steering wheels and fittings and professional quality finish restorations that are well documented with photo's and material receipts to prove the job was done correctly.

Most of the boats being restored from the fifties or sixties will have moderate to severe cracking and deterioration of the Gel Coat finish. These gel coat flaws only go as deep as the underlying fiberglass, but do not penetrate the fiberglass so there is nothing to worry about structurally unless the crack has actually begun in the fiberglass its self and then continued into the finish. This type of damage is unusual and pretty self evident, however. Such damage would likely have been caused by a pretty severe blow that would be hard to miss. If this is the case, look to the fiberglass repair tips above for advice. Two acceptable ways to restore a finish are as follows, but first a word from the legal department inside my brain.

## **Safety**

I am not a lawyer, so all I can say here is that power tools are dangerous and chemicals are bad for you. Read product labels and consult with suppliers regarding safety, ventilation, and ways to avoid killing yourself. Comprehensive safety instructions are not within the scope of this article. It is your own responsibility to research this subject.

## **Painting**

In order to refinish a boat with automotive paint the Gel Coat will have to be removed, unless it is almost completely crack free. In that case, anywhere cracks do remain they must be addressed using a small grinding disc to open up and clean out the cracks. New gel coat can then be applied and worked into the ground out crack. prior to painting, without adequate preparation the crack will certainly return. The boat may now be scuffed, primed and painted in accordance with typical painting methods touched on below. This crack filling procedure would be very labor intensive in all but the most perfectly preserved boats and while this may give a reasonably good result, the only certain way to prevent the return of cracks in a fifty year old boat is to remove all of the Gel Coat.

To remove the Gel Coat I find a two step approach to work well for me. I first use a belt sander with 36 grit and sand until I begin to see the underlying fiberglass, I then move on to a different area. I only do one area of manageable size at a time. Once I have a large area done, I switch to an electric drill which I have placed a nylon bristle brush into. This brush is commonly available at hardware stores and is

impregnated with a course grit. I use this brush to do light finish work on the remaining gel coat as it works the area more slowly and with much greater control.

One of the difficult aspects of this removal is the fact that the gel coat has varying thickness, it is thinner on vertical surfaces and much thicker at low points in the mold such as the tops of the fins (decks are made upside down and the gel coat runs prior to curing). When this original finish is removed, the deck ends up with hills and valleys. These must now be filled with body filler and block sanded smooth. Body filler, commonly referred to by the trade name Bondo, has a bad name in the car hobby due to incorrect usage by amateurs on cars but in this application it is completely correct and appropriate. Body filler can be shaped and sculpted to replace the original surfaces and curvatures of the boat as designed, subject to the skill of the restorer. Once this work is finished, the final epoxy priming and finish sanding is done in the manner that one would use on a Corvette.

When ready, the paint should be applied in either a single stage or base coat / clear coat finish with use of a hardener in either case. Single stage paint will give a more correct looking finish and be more authentic in appearance. Base Coat / Clear Coat gives a super glossy shine and is the favorite of the casual observer such as those attending car shows, but to a knowledgeable boat collector will be clear giveaway that the boat has been done in paint. This is, of course, a personal choice. One thing to be aware of in a painted boat is that paint will allow water penetration if left sitting overnight at the dock more readily than Gel Coat. Daily use from a boat trailer will be no problem but boats to be left in the water for extended periods should be Gel Coated only, even then there is a possibility of water penetration so you may want to consider a dry dock. The problem with water penetration is that it will saturate the body filler and cause serious and unsightly blistering.

### **Gel Coat**

If you have decided not to paint the boat then Gel coat is the only alternative you are left with. You will need a special spray gun to apply Gel Coat so consult with your supplier. Keep in mind that a boat is subject to a lot of flexing during normal use and even a finish that looks good at the outset may go bad once it is put back into service so repair and paint or topcoat the original gel coat at your own risk.

To avoid building up too thick a layer of Gel Coat, and to prepare for good adhesion, you will need to grind some of the original away with 36 grit. Depending on the condition of the original Gel Coat, it may not be necessary to completely remove the entire layer of existing Gel Coat, but just to grind it down evenly to make room for the fresh new layer and promote adhesion. use a small grinding disc to open up and clean out any cracks that remain to allow good penetration. Since this is the same material it should bond well enough to prevent any cracks from returning, but as before, this is your call. The best procedure would be to remove all of the Gel Coat. In any event, a fresh layer can now be applied. If only partially removed, this fresh top coat will cover up the original faded or repaired Gel Coat as well as any cleaned cracks, gouges and dips. Once applied the new Gel Coat layer will come out with a severe orange peel texture so a great deal of block sanding and polishing are now necessary. This process is very labor intensive and is the reason many people opt for Painting. Never-the less, Gel Coat is the best type of finish for a boat that is to be used often. A lot of people feel that if it is worth doing, it is worth doing right, and that old adage makes a good deal of sense to me.

### **Conclusion**

This covers some of the more common areas of confusion. There is a lot more to be said but it is time to get this on the web. I will try to add to it in the future and welcome any topic suggestions or further questions. There are many different approaches and many different situations. The most important thing it to have fun and attempt to do no harm. These few remaining classics are to be enjoyed for now and preserved for the future! Good luck!